

CLAIMS

What is claimed is:

1. A method of communicating video from a sender to a receiver over a network comprising the steps of:

5 receiving a frame;
determining if the received frame is from a first sub-sequence of frames;
when the frame is from a first sub-sequence of frames, encoding the frame, packetizing the frame, and sending the packet via a first path; and
otherwise, when the frame is not from a first sub-sequence of frames,
10 encoding the frame, packetizing the frame, and sending the packet via a second path.

2. The method of claim 1 wherein first sub-sequence and second sub-sequence are selected based on time or space.

3. The method of claim 1 wherein the step of determining if the received frame is from a first sub-sequence of frames includes determining if the frame is an odd frame or an even frame.

20 4. The method of claim 1 wherein the packet includes a label for identifying whether the packet is part of the first sub-sequence or the second sub-sequence.

5. The method of claim 1 further comprising the steps of:
determining if a packet is from a first sub-sequence;
25 when the packet is from a first sub-sequence, decoding the packet;
determining if there is an error in the packet;
when there is an error, determining if a reduce frame rate is acceptable;
when a reduce frame rate is acceptable, displaying the video at a reduced frame rate by employing frames from the second sub-sequence;

when a reduced frame rate is not acceptable, performing state recovery on first frame by employing one of a previous frame and a future frame from one of the first sub-sequence and the second sub-sequence.

5 6. The method of claim 1 further comprising the steps of:

determining if a packet is from a first sub-sequence;

when the packet is from a first sub-sequence, decoding the packet;

determining if there is an error in the packet;

when there is an error, performing state recovery on first frame by employing one of a previous frame and a future frame from one of the first sub-sequence and the second sub-sequence.

10 7. The method of claim 6 wherein the step of performing state recovery on first frame by employing one of a previous frame and a future frame from one of the first sub-sequence and the second sub-sequence includes

estimating a lost frame;

employing the estimate frame in future decoding; and

displaying the estimated frame.

15 8. A system of communicating video from a sender to a receiver over a network comprising:

a separator for receiving a first frame with a sub-sequence identifier field and specifying the sub-sequence identifier field of the first frame with one of a first sub-sequence identifier and of a second sub-sequence identifier based on a predetermined criteria;

25 an encoder coupled to the separator for encoding the first frame; and

a transmitter for transmitting the first frame via a first path and a second path based on the sub-sequence identifier field.

9. The system of claim 8 further comprising:

a receiver for receiving the first frame;

a decoder coupled to the receiver for decoding the first frame and determining if there is an error in the first frame; and

5 a state recovery unit coupled to the decoder for performing state recovery on the first frame by employing one of a previous frame and a future frame when there is an error.

10. The system of claim 8 further comprising:

10 a sender for estimating the quality of the state recovery by employing multiple states and comparing a recovered corrupted stream with a known correctly received stream.

11. The method of claim 1 further comprising the steps of:

receiving at least one path quality parameter; and

15 in response to the path quality parameter dynamically modifying at least one video encoding parameter.

12. The method of claim 1 wherein the path quality parameter is provided
20 through a feedback link with the receiver.

13. The method of claim 1 wherein the video encoding parameter includes quantization, frame rate, and spatial resolution of the encoding.

25 14. The method of claim 1 further comprising the steps of:

receiving at least one path quality parameter; and

in response to the path quality parameter dynamically modifying at least one communication parameter.

15. The method of claim 1 wherein the communication parameter includes number of paths and path configuration.

16. The method of claim 1 wherein the path quality parameter includes
5 bandwidth, packet loss rate, delay, and quality of service.

17. The method of claim 1 wherein the number of paths is dynamically modified to be one path and the number of states is dynamically modified to be one state.

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18. A method for communicating an original series of video frames over a network comprising:
receiving the original series of video frames;
separating the original series of video frames into odd video frames and even video
15 frames;
encoding the odd video frames to encoded odd video frames;
encoding the even video frames to encoded even video frames; wherein the encoded odd video frames and the encoded even video frames are independently decodable;
transmitting the encoded odd video frames by employing a first path over the
20 network; and
transmitting the encoded even video frames by employing a second path over the network

19. The method of claim 18 further comprising:
25 receiving the encoded odd video frames;
receiving the encoded even video frames;
decoding the encoded odd video frames to generate re-constructed odd video frames;
decoding the encoded even video frames to generate re-constructed even video frames; and

merging the re-constructed odd video frames and re-constructed even video frames to recover the original video frames.

20. The method of claim 18 further comprising:

- 5 receiving the encoded odd video frames;
receiving the encoded even video frames;
merging the encoded odd video frames and encoded even video frames to generate a composite series of encoded frames; and
decoding the series of composite encoded video frames to recover the original video
10 frames.

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